

SECTION III—REMARKS

This amendment is submitted in response to the final Office Action mailed June 8, 2004. No claims are amended, and claims 23-33 are canceled. Claims 1-22 and 34-44 remain pending in the application. Applicants respectfully request allowance of all pending claims in view of the above amendments and the following remarks.

Rejections Under 35 U.S.C. § 102

The Examiner rejected claims 1-2, 8-9, 11-13, 16, 19-20, 22, 34-35, 41-42 and 44 as anticipated under 35 U.S.C. § 102(b) by U.S. Patent Application Publication No. 2002/0074238 to Mayer et al (“Mayer”). Applicants respectfully traverse the Examiner’s rejections. A claim is anticipated only if each and every element, as set forth in the claim, is found in a single prior-art reference. MPEP § 2131; *Verdegaal Bros. v. Union Oil of California*, 2 U.S.P.Q.2d 1051, 1053 (Fed. Cir. 1987). As explained below, Mayer cannot anticipate these claims because it does not disclose every element and limitation recited therein.

Claim 1 recites a process combination including providing a wafer, the wafer comprising an inter-layer dielectric (ILD) having a feature therein, an under-layer deposited on the ILD, a barrier layer deposited on the under-layer and a conductive layer deposited on the barrier layer; exposing the barrier layer; placing the wafer in an electrolyte, such that at least the barrier layer is immersed in the electrolyte; and “applying an electrical potential between the wafer and an electrode immersed in the electrolyte until at least part of the barrier layer is removed.”

When examining the claims, the Examiner must interpret the meaning of terms in the claim consistently with the specification. See MPEP § 2111. Here, the Examiner appears to have overlooked the definition of the term “barrier layer,” as recited in the claims and discussed in the specification. The term “barrier layer,” as used in the specification and claims of the present application, refers to a layer that lies between a conductive layer and an under-layer on an inter-layer dielectric (ILD). The “barrier layer” whose removal is discussed in Mayer is defined differently. As shown in Figures 2A-2G and 3A, the so-called “barrier layer” whose removal Mayer discusses is a layer deposited *on top of the metal layer* to assist in selective planarization of different areas of the metal layer.

With the claim term "barrier layer" properly interpreted, Mayer cannot disclose, teach or suggest a combination including the recited limitations. Instead, Mayer teaches that electrolysis is used to remove part of the metal layer from the surface of a wafer. After the desired amount of metal is removed to planarize the metal layer, all electrolysis is stopped. *See, e.g.,* Figure 2A, box 211; Figure 3A, box 304; paragraph [0042]; paragraph [0078]. Mayer does not disclose, teach or suggest the exposure or removal of any layer—barrier or otherwise—lying between the metal layer and the dielectric. Mayer therefore cannot disclose, teach or suggest a combination including "exposing the barrier layer" and "applying an electrical potential between the wafer and an electrode immersed in the electrolyte until at least part of the barrier layer is removed." Applicants submit that Mayer therefore cannot anticipate claim 1 and respectfully request withdrawal of the rejection and allowance of the claim.

Regarding claims 2, 8-9 and 11, if an independent claim allowable, then any claim depending therefrom is also allowable. *See, e.g.,* MPEP § 2143.03; *In re Fine*, 837 F.2d 1071 (Fed. Cir. 1988). As discussed above, claim 1, as amended, is in condition for allowance. Applicants therefore respectfully submit that claims 2, 8-9 and 11 are therefore also allowable by virtue of their dependence on an allowable independent claim, as well as by virtue of the features recited therein. Applicants therefore respectfully request withdrawal of the rejections and allowance of these claims.

Claim 12 recites a process combination including providing a wafer, the wafer comprising an inter-layer dielectric (ILD) having a feature therein, an under-layer deposited on the ILD, and a barrier layer deposited on the under-layer, and a conductive layer deposited in the feature; placing the wafer in an electrolyte, such that at least the barrier layer is immersed in the electrolyte; and "applying an electrical potential between the wafer and an electrode immersed in the electrolyte until at least part of the barrier layer is removed." By analogy to the discussion above for claim 1, Mayer does not disclose, teach or suggest a combination including "applying an electrical potential between the wafer and an electrode immersed in the electrolyte until at least part of the barrier layer is removed." Applicants submit that Mayer therefore cannot anticipate claim 12 and respectfully request withdrawal of the rejection and allowance of the claim.

Regarding claims 13, 16, 19-20 and 22, if an independent claim allowable, then any claim depending therefrom is also allowable. *See, e.g.*, MPEP § 2143.03; *In re Fine*, 837 F.2d 1071 (Fed. Cir. 1988). As discussed above, claim 12, as amended, is in condition for allowance. Applicants respectfully submit that claims 13, 16, 19-20 and 22 are therefore also allowable by virtue of their dependence on an allowable independent claim, as well as by virtue of the features recited therein. Applicants therefore respectfully request withdrawal of the rejections and allowance of these claims.

Claim 34 recites a process combination including providing a wafer, the wafer comprising an inter-layer dielectric (ILD) having a feature therein, an under-layer deposited on the ILD, a barrier layer deposited on the under-layer and a conductive layer deposited on the barrier layer; exposing the barrier layer; and “electrolytically removing at least part of the barrier layer.” By analogy to the discussion above for claim 1, Mayer does not disclose, teach or suggest a combination including “electrolytically removing at least part of the barrier layer.” Applicants submit that Mayer therefore cannot anticipate new claim 34, and respectfully request withdrawal of the rejection and allowance of the claim.

Regarding new claims 35-44, if an independent claim allowable, then any claim depending therefrom is also allowable. *See, e.g.*, MPEP § 2143.03; *In re Fine*, 837 F.2d 1071 (Fed. Cir. 1988). As discussed above, new claim 34 is in condition for allowance. Applicants respectfully submit that claims 35-44 are therefore also allowable by virtue of their dependence on an allowable independent claim, as well as by virtue of the features recited therein. Applicants therefore respectfully request withdrawal of the rejections and allowance of these claims.

Rejections Under 35 U.S.C. § 103

The Examiner rejected claims 3-7, 10, 14-15, 17-18, 21, 36-40 and 43 under 35 U.S.C. § 103(a) as obvious in view of, and therefore unpatentable over, Mayer in view of U.S. Patent Application Publication No. 2003/0207558 to Bao et al (“Bao”). Applicants respectfully traverse the Examiner’s rejections. If an independent claim is non-obvious under 35 U.S.C. § 103, then any claim depending therefrom is also non-obvious. MPEP § 2143.03; *In re Fine*, 837 F.2d 1071 (Fed. Cir. 1988). As discussed above, independent claims 1, 12 and 34 are in condition for allowance. Applicant therefore respectfully submits that claims 3-7, 10, 14-15, 17-18, 21, 36-40

and 43 are allowable by virtue of their dependence on allowable independent claims, as well as by virtue of the features recited in the dependent claims themselves. Applicants therefore respectfully request withdrawal of the rejections and allowance of these claims.

Conclusion

Given the above amendments and accompanying remarks, all claims pending in the application are in condition for allowance. If the undersigned attorney has overlooked a teaching in any of the cited references that is relevant to allowance of the claims, the Examiner is requested to specifically point out where such teaching may be found. Further, if there are any informalities or questions that can be addressed via telephone, the Examiner is encouraged to contact the undersigned attorney at (206) 292-8600.

Charge Deposit Account

Please charge our Deposit Account No. 02-2666 for any additional fee(s) that may be due in this matter, and please credit the same deposit account for any overpayment.

Respectfully submitted,

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Date: 8-9-04

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Enclosures: PTO fax cover sheet
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